Claim Amendments

Applicants have amended claims 1, 2, 9, 30, 32, 33 and 40, and have cancelled claims 8, 10, 20, 22, 39, 41, 51 and 53 without prejudice. Applicants set forth below a complete listing of the claims with the corresponding status indicated for each claim.

1.    (Currently Amended) A method of digital image compression, comprising:

identifying a plurality of areas of interest in at least a subset of digital images in a sequence of related images; and

extrapolating areas of interest for a remainder of images in the sequence from the identified areas of interest;

using a histogram to determine most popular identified area of interest; and

encoding the most popular identified areas of interest at a first quality level and unidentified areas of the image at a second and lower quality level than the most popular identified areas in order to produce a single compressed copy of each image which can be decoded at a decoder, wherein:

a size of the identified areas of interest corresponds to an angular coverage of an average human fovea at a predetermined viewing distance;

the areas of interest are identified by a group of viewers; and

said group of viewers comprises a statistically representative subset of an intended audience for the sequence of related images in order to predict areas of interest of the intended audience.

2.    (Currently Amended) A method in accordance with claim 1, further comprising[[:]] creating a quantization map based on the identified areas of interest, wherein[[:]] the encoding is performed based on the quantization map.

3-5.    (Cancelled).

6.    (Previously presented) A method in accordance with claim 1, wherein the areas of interest are identified by tracking the eye gaze point of said viewers as the viewers view the image.

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7.     (Previously presented) A method in accordance with claim 1, wherein the areas of interest are identified by said viewers using a pointing device to designate the areas of interest on a display of the image.

8.     (Cancelled).

9.     (Currently Amended) A method in accordance with claim 1, wherein[[:]] the sequence of related images comprises a digital motion picture.

10.     (Cancelled).

11.     (Original) A method in accordance with claim 1, wherein the areas of interest are identified in real time during a live transmission of the image.

12.     (Original) A method in accordance with claim 1, wherein the digital image is a spatially representative version of the image to be encoded.

13.     (Original) A method in accordance with claim 1, further comprising:
        assigning values to each area of interest based on the amount of interest in that area, first values being assigned to areas with higher interest and second values being assigned to areas of lower interest; and
        encoding each area of interest at a quality level corresponding to the assigned value, said areas with said first values being encoded at higher quality levels than said areas with said second values.

14.     (Original) A method in accordance with claim 1, wherein said encoding is performed to provide a gradual transition in quality between an identified area of interest and an unidentified area.

15.     (Original) A method in accordance with claim 1, wherein the encoding is performed using a block discrete cosine transform (DCT).

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16.    (Original) A method in accordance with claim 15, wherein the quality level for blocks of pixels is adjusted for the areas of interest through the use of a quantization scale factor encoded for each block of pixels.

17.    (Original) A method in accordance with claim 15, wherein the quality levels of the unidentified areas are adjusted downward by one of: (i) truncating one or more DCT frequency coefficients; (ii) setting to zero one or more DCT frequency coefficients; or (iii) otherwise discarding one or more DCT frequency coefficients, on a block by block basis.

18.    (Original) A method in accordance with claim 1, wherein the encoding is performed using a wavelet transform.

19.    (Original) A method in accordance with claim 1, wherein the quality level for the unidentified areas is adjusted downward by pre-filtering the image with a spatially varying spatial frequency filter prior to encoding.

20-22.    (Cancelled).

23.    (Original) A method in accordance with claim 1, wherein the areas of interest are identified while the image is in transit.

24.    (Original) A method in accordance with claim 1, wherein the areas of interest are identified while the image is partially displayed.

25.    (Original) A method in accordance with claim 1, wherein the quality level of the unidentified areas of the image is reduced for security purposes.

26.    (Original) A method in accordance with claim 1, wherein one of a constant bit rate or a constant compression ratio is maintained.

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27.    (Original) A method in accordance with claim 1, wherein:

the identified areas of interest are transmitted according to level of interest, so that areas with a higher level of interest are transmitted first with successively lower interest level areas transmitted successively thereafter; and

the image is built up as it is received starting with the areas of highest interest.


28.    (Original) A method in accordance with claim 1, wherein identified areas of interest from multiple images are statistically recorded.


29.    (Cancelled).


30.    (Currently Amended) A method in accordance with claim 1, further comprising[[:]] enhancing the quality levels of certain unidentified areas to artificially create additional areas of interest from said certain unidentified areas in order to draw a viewer's attention to said additional areas of interest.


31.    (Previously presented) A method in accordance with claim 30, wherein the additional areas of interest are image areas containing at least one of a product and a name of a product.


32.    (Currently Amended) A system for digital image compression, comprising:
a digital image display;

means for a group of viewers to identify a plurality of areas of interest in at least a subset of digital images in a sequence of related images provided by said display; and

a means for extrapolating areas of interest for a remainder of images in the sequence from the identified areas of interest;

means for using a histogram to determine most popular identified area of interest; and

an encoder, wherein the encoder encodes the most popular identified areas

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of interest at a first quality level and unidentified areas of the image at a second and lower quality level than the <u>most popular</u> identified areas in order to produce a single compressed copy of each image which can be decoded at a decoder[[;]], wherein:

a size of the identified areas of interest corresponds to an angular coverage of an average human fovea at a predetermined viewing distance; and

the group of viewers comprises a statistically representative subset of an intended audience for the sequence of related images in order to predict areas of interest of the intended audience.

33.     (Currently Amended) A system in accordance with claim 32, further comprising a quantization map created based on said identified areas of interest, wherein[[:]] the encoding is performed based on the quantization map.

34-36.     (Cancelled).

37.     (Previously presented) A system in accordance with claim 32, wherein the means for identifying areas of interest comprises eye tracking mechanisms for tracking the eye gaze point of the viewers as the viewers view the image.

38.     (Previously presented) A system in accordance with claim 32, wherein the means for identifying areas of interest comprises pointing devices for designating the areas of interest on the image display.

39.     (Cancelled).

40.     (Currently Amended) A system in accordance with claim 32, wherein[[:]] the sequence of related images comprises a digital motion picture.

41.     (Cancelled).

42.     (Original) A system in accordance with claim 32, wherein the areas of interest are identified in real time during a live transmission of the image.

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43.   (Original) A system in accordance with claim 32, wherein the digital image is a spatially representative version of the image to be encoded.

44.   (Original) A system in accordance with claim 32, wherein:

values are assigned to each area of interest based on the amount of interest in that area, first values being assigned to areas with higher interest and second values being assigned to areas of lower interest; and

each area of interest is encoded at a quality level corresponding to the assigned value, said areas with said first values being encoded at higher quality levels than said areas with said second values.

45.   (Original) A system in accordance with claim 32, wherein said encoding is performed to provide a gradual transition in quality between an identified area of interest and an unidentified area.

46.   (Original) A system in accordance with claim 32, wherein the encoding is performed using a block discrete cosine transform (DCT).

47.   (Original) A system in accordance with claim 46, wherein the quality level for blocks of pixels is adjusted for the areas of interest through the use of a quantization scale factor encoded for each block of pixels.

48.   (Original) A system in accordance with claim 46, wherein the quality levels of the unidentified areas are adjusted downward by one of: (i) truncating one or more DCT frequency coefficients; (ii) setting to zero one or more DCT frequency coefficients; or (iii) otherwise discarding one or more DCT frequency coefficients, on a block by block basis.

49.   (Original) A system in accordance with claim 32, wherein the encoding is performed using a wavelet transform.

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50. (Original) A system in accordance with claim 32, further comprising:

a spatially varying spatial frequency filter, wherein the quality level for the unidentified areas is adjusted downward by pre-filtering the image using the spatial frequency filter prior to encoding.

51-53. (Cancelled).

54. (Original) A system in accordance with claim 32, wherein the areas of interest are identified while the image is in transit.

55. (Original) A system in accordance with claim 32, wherein the areas of interest are identified while the image is partially displayed.

56. (Original) A system in accordance with claim 32, wherein the quality level of the unidentified areas of the image is reduced for security purposes.

57. (Original) A system in accordance with claim 32, wherein one of a constant bit rate or a constant compression ratio is maintained.

58. (Original) A system in accordance with claim 32, wherein:

the identified areas of interest are transmitted according to level of interest, so that areas with a higher level of interest are transmitted first with successively lower interest level areas transmitted successively thereafter; and

the image is built up as it is received starting with the areas of highest interest.

59. (Original) A system in accordance with claim 32, wherein identified areas of interest from multiple images are statistically recorded.

60. (Cancelled).

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61.     (Previously presented) A system in accordance with claim 32, wherein the quality levels of certain unidentified areas are enhanced to artificially create additional areas of interest from said certain unidentified areas in order to draw a viewer's attention to said additional areas of interest.

62.     (Previously presented) A system in accordance with claim 61, wherein the additional areas of interest are image areas containing at least one of a product and a name of a product.

63.     (Previously Presented) A method of digital image compression, comprising:

identifying a plurality of areas of interest in each digital image in a digital motion picture by tracking the eye gaze point of a plurality of viewers as the viewers view each image;

creating a histogram of the identified areas of interest to determine the most popular identified areas of interest; and

encoding the most popular identified areas of interest of each image at a first quality level and remaining areas of each image at a second and lower quality level than the most popular identified areas in order to produce a single compressed copy of each image which can be decoded at a standard decoder;

wherein the plurality of viewers comprises a statistically representative subset of an intended audience for the motion picture in order to predict areas of interest of the intended audience.

64.     (Previously Presented) A system for digital image compression, comprising:

a digital image display device for displaying a related sequence of digital images comprising a digital motion picture;

a plurality of eye tracking mechanisms for tracking the eye gaze of a plurality of viewers as the viewers view each digital image in the digital motion picture order to identify a plurality of areas of interest in each digital image;

means for creating a histogram of the identified areas of interest to determine the most popular identified areas of interest; and

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an encoder, wherein the encoder encodes the most popular identified areas of interest of each image at a first quality level and encodes remaining areas of each image at a second and lower quality level than the most popular identified areas in order to produce a single compressed copy of each image which can be decoded at a standard decoder;

wherein the plurality of viewers comprises a statistically representative subset of an intended audience for the motion picture in order to predict areas of interest of the intended audience.

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